

MgO Tunnel Barriers and Method of Formation

Abstract

5 MgO tunnel barriers are formed by depositing a thin layer of Mg on a suitable underlayer, and then directing oxygen and additional Mg towards the Mg layer. The oxygen reacts with the additional Mg and the Mg in the Mg layer to form a MgO tunnel barrier that enjoys excellent tunneling characteristics. The MgO tunnel barriers so formed may be used in magnetic tunnel junctions having tunneling magnetoresistance 10 (TMR) values of greater than 100%. The highest TMR values are observed for junctions that have been annealed and that have a (100) crystallographic orientation.

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